

# High Frequency Ceramic Solutions

Impedance Matched Balun + Harmonic Filter compatible with: Realtek RTL8188EU and  
RTL8192EU and ST BlueNRG chipsets

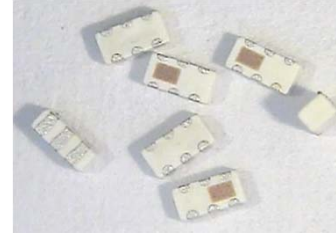
P/N 2450BM14A0023

Detail Specification: 2/27/2015

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## General Specifications

Part Number	2450BM14A0023		
Frequency (MHz)	2400 - 2500		
Unbalanced Impedance	50 $\Omega$		
Balanced Differential Impedance	Conjugate match compatible to RTL8188EU, RTL8192EU and ST BlueNRG chipsets		
Insertion Loss (dB)	1.2 max.		
Return Loss (dB)	9.5 min.		
Phase Difference (degree)	180° $\pm$ 10	Operating Temperature Range	-40 ~ +85°C
Amplitude Difference	2.0 max.	Storage Temperature Range	-40 ~ +85°C
Attenuation (dB)	30 min. @4800~5000MHz	Recommended Storage Conditions for Unused product on T&R	+5 ~ +35 °C, Humidity 45~75%RH, 18 months.
Qty/Reel (pcs)	4,000		
Power Capacity	2W max (CW)	Storage Period	18 months max.



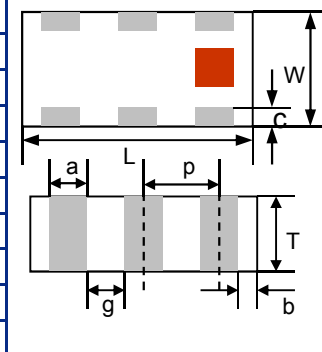
You can download measured s-parameters of this component at: [www.johansontechnology.com/chipset-ipc](http://www.johansontechnology.com/chipset-ipc)

## Part Number Explanation

P/N Suffix	Packaging Style	Bulk	Suffix = S	E.g.. 2450BM14A0023S
		T & R	Suffix = T	E.g.. 2450BM14A0023T
	Termination Style	100% Tin	Suffix = None	E.g.. 2450BM14A0023(T or S)

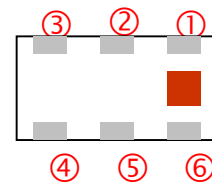
## Mechanical Dimensions

	Inches	Millimeter
L	0.063 $\pm$ 0.004	1.60 $\pm$ 0.10
W	0.031 $\pm$ 0.004	0.80 $\pm$ 0.10
T	0.024 $\pm$ 0.004	0.60 $\pm$ 0.10
a	0.008 $\pm$ 0.004	0.20 $\pm$ 0.10
b	0.008+0.004/-0.006	0.2+0.1/-0.15
c	0.006 $\pm$ 0.004	0.15 $\pm$ 0.10
g	0.012 $\pm$ 0.004	0.30 $\pm$ 0.10
p	0.020 $\pm$ 0.002	0.50 $\pm$ 0.05



## Terminal Configuration

No	Function	No	Function
1	GND	4	Balanced Port
2	GND	5	DC feed + RF GND
3	Balanced Port	6	Unbalanced Port



Note: Use a 10pF capacitor in shunt when using DC-Feed

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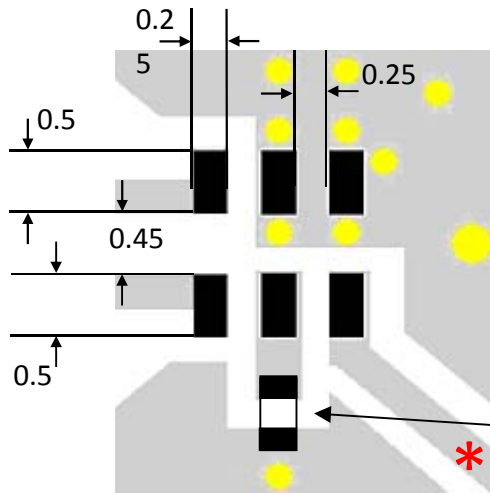
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## Mounting Considerations for Balun-Filter solder pads



\* Line width should be designed to match 50Ω characteristic impedance, depending on PCB material and thickness.

■ Solder Resist

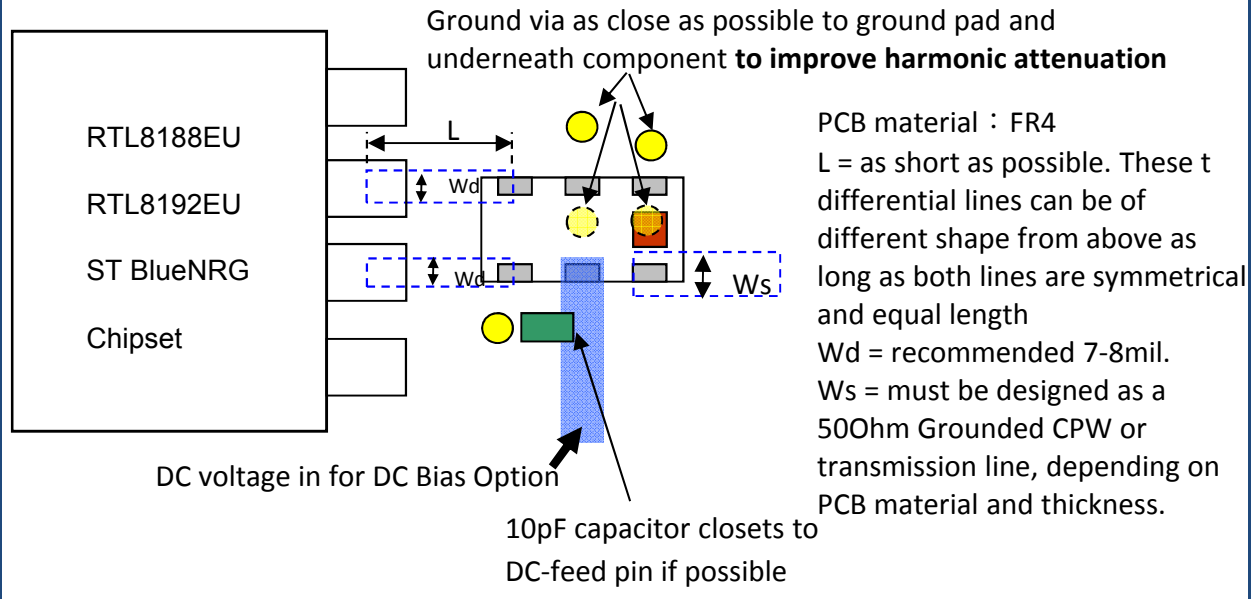
■ Land

● Through-hole ( $\phi$  0.3/0.2)

10pF capacitor

Do you need the layout/gerber files of the above? Go to: [www.johansontechnology.com/nordic](http://www.johansontechnology.com/nordic) or send us a message at <http://www.johansontechnology.com/component/techquestion/?Itemid=407>

## Recommended PCB Layout



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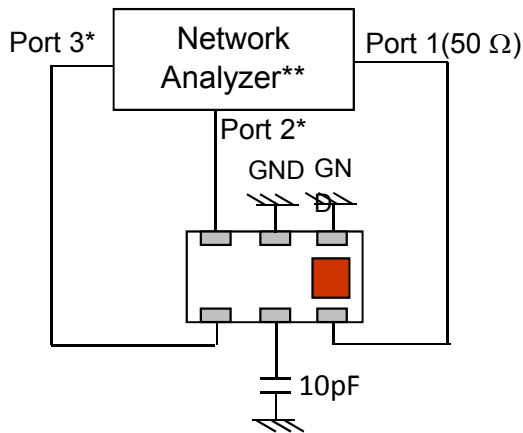
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## Component Characterization Diagram



Port 1: Unbalanced Port

Ports 2 and 3: Balanced Port

$$IL = S_{ds21}$$

$$RL = S_{ss11} \text{ and } S_{dd22}$$

$$\text{Amp\_balance} = \text{dB}(S(2,1)/S(3,1))$$

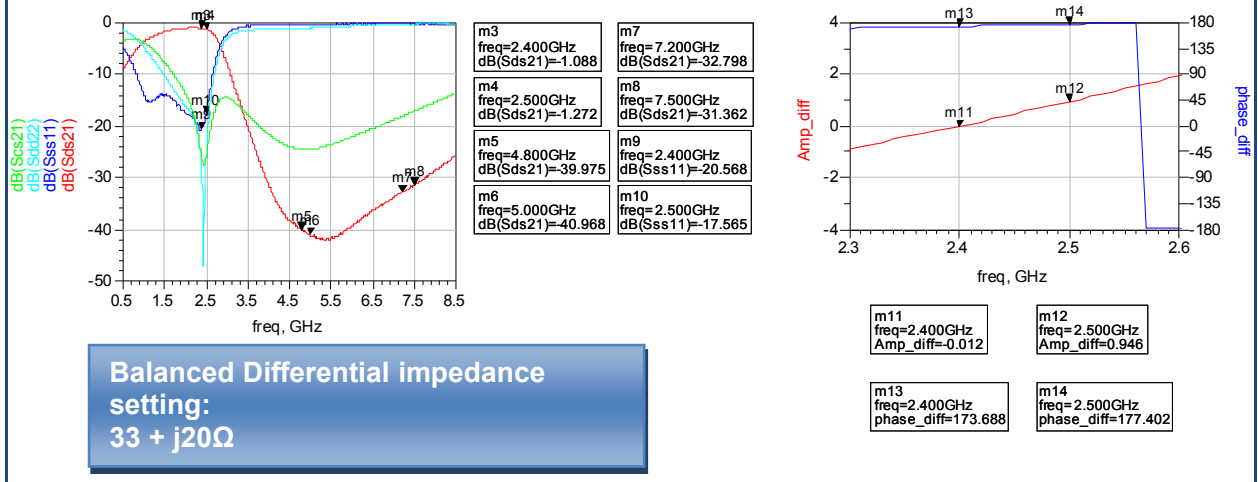
$$\text{Phase\_balance} = \text{Phase}(S(2,1)/S(3,1))$$

\*Impedance for ports 2 and 3

= Conjugate to Balanced Impedance/2

\*\* E5071B from Agilent

## Typical Electrical Characteristics (T=25°C)



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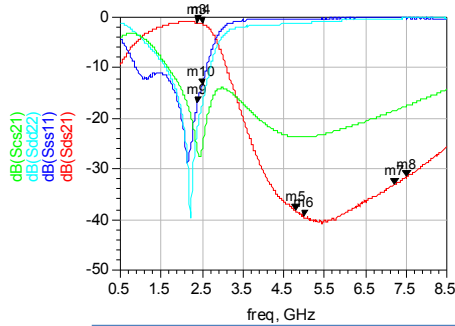
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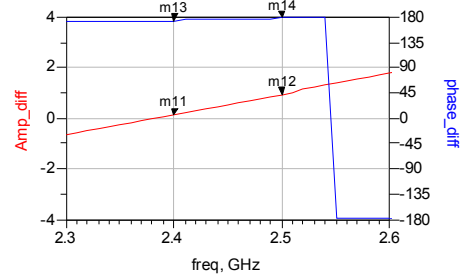
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## Typical Electrical Characteristics (T=25°C)

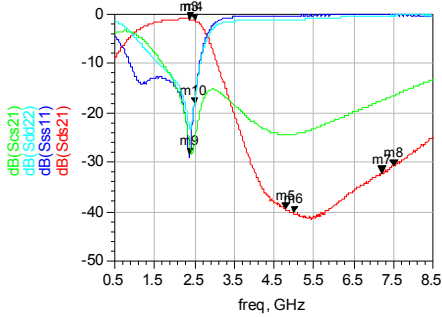


m3 freq=2.400GHz dB(Sds21)=-1.110	m7 freq=7.200GHz dB(Sds21)=-33.166
m4 freq=2.500GHz dB(Sds21)=-1.339	m8 freq=7.500GHz dB(Sds21)=-31.687
m5 freq=4.800GHz dB(Sds21)=-38.313	m9 freq=2.400GHz dB(Sss11)=-16.989
m6 freq=5.000GHz dB(Sds21)=-39.378	m10 freq=2.500GHz dB(Sss11)=-13.562

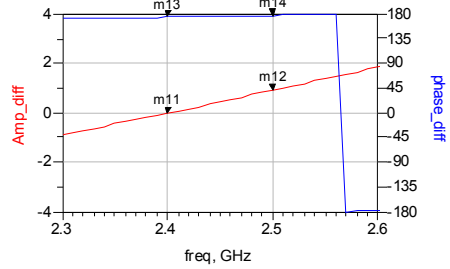


m11 freq=2.400GHz Amp_diff=0.107	m12 freq=2.500GHz Amp_diff=0.958
m13 freq=2.400GHz phase_diff=173.924	m14 freq=2.500GHz phase_diff=177.914

Balanced Differential impedance  
setting:  
 $31.4 + j26.6\Omega$



m3 freq=2.400GHz dB(Sds21)=-1.104	m7 freq=7.200GHz dB(Sds21)=-32.224
m4 freq=2.500GHz dB(Sds21)=-1.324	m8 freq=7.500GHz dB(Sds21)=-30.794
m5 freq=4.800GHz dB(Sds21)=-39.405	m9 freq=2.400GHz dB(Sss11)=-28.379
m6 freq=5.000GHz dB(Sds21)=-40.286	m10 freq=2.500GHz dB(Sss11)=-18.192



m11 freq=2.400GHz Amp_diff=0.045	m12 freq=2.500GHz Amp_diff=0.898
m13 freq=2.400GHz phase_diff=174.155	m14 freq=2.500GHz phase_diff=177.399

Balanced Differential impedance  
setting:  
 $28.8 + j18.5\Omega$

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## Application Notes, Layout Files, and more

[www.johansontechnology.com/chipset-ipc](http://www.johansontechnology.com/chipset-ipc)

## Packaging information

[www.johansontechnology.com/ipcpackaging.html](http://www.johansontechnology.com/ipcpackaging.html)

## Soldering Information

[www.johansontechnology.com/ipcsoldering-profile](http://www.johansontechnology.com/ipcsoldering-profile)

## MSL Info

[www.johansontechnology.com/technical-notes/msl-rating.html](http://www.johansontechnology.com/technical-notes/msl-rating.html)

## Recommended Storage Condition and Max Shelf Life

[www.johansontechnology.com/ipcstorage-shelflife](http://www.johansontechnology.com/ipcstorage-shelflife)

## RoHS Compliance

[www.johansontechnology.com/technical-notes/rohs-compliance.html](http://www.johansontechnology.com/technical-notes/rohs-compliance.html)

## Antenna layout and tuning techniques

[www.johansontechnology.com/tuning](http://www.johansontechnology.com/tuning)

## Antenna layout review, tuning, and characterization services

[www.johansontechnology.com/ipcantennaservices](http://www.johansontechnology.com/ipcantennaservices)

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